TECHNICAL DATA SHEET

MCM-41 Molecular Sieve

Ordered mesoporous silica · hydrothermal method · Type A / Type B · BET >850 / >800 m²/g · calcined, ready to use



ACS Material MCM-41 Molecular Sieve — Representative Packaging

ACS Material MCM-41 Molecular Sieve in an ACS Material bottle. Image shown for reference; label and packaging may vary.

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SECTION I

Product Overview

Mobil Composition of Matter No. 41 (MCM-41) is a mesoporous material developed by the Mobil Oil Corporation. It is part of a family of silicate and aluminosilicate solids that are well suited for use as catalysts and catalytic supports. ACS Material MCM-41 (CAS No. 7631-86-9) is prepared by the hydrothermal method and is supplied calcined and ready to use directly, in two grades: Type A (reagent grade, average pore diameter 3.4 nm, BET surface area >850 m^2/g) and Type B (industrial grade, average pore diameter 3.5–4.0 nm, BET surface area >800 m^2/g).

MCM-41 is built on an ordered arrangement of cylindrical mesopores that form a one-dimensional pore system with a sharp, well-defined pore distribution and large surface area and pore volume; across the MCM-41 class of materials the pores range from about 2 nm to 6.5 nm in diameter. During synthesis a surfactant (typically cetyltrimethylammonium bromide, CTAB) forms rod-shaped micelles that align into hexagonal arrays; silica species cover the rods, and calcination condenses the silanol groups and removes the organic template. Because there is no aluminum in the lattice framework, MCM-41 has no Brønsted acid centers and an acidity analogous to amorphous aluminosilicates. The low level of cross-linking between silicate units and its thin walls mean that MCM-41 is not hydrothermally stable.

SECTION II

Core Advantages

— **Ordered cylindrical mesopores** — a one-dimensional pore system with a sharp, well-defined pore size distribution.

— **Large pore volume** — ≥0.75 cm^3/g for both grades; average pore diameter 3.4 nm (A) or 3.5–4.0 nm (B).

— **Calcined and ready to use** — the template is removed; the powder can be used directly.

— **High surface area** — BET surface area >850 m^2/g (Type A) or >800 m^2/g (Type B).

— **Two grades** — Type A reagent grade (20 g) and Type B industrial grade (50 g or 100 g); quotes for orders above 1 kg.

— **Pure silica framework** — no aluminum in the lattice, no Brønsted acid centers; Na_2O ≤0.5%.

SECTION III

Specifications

Technical data — all grades

Specifications	
Product name	MCM-41 Molecular Sieve
Brand	ACS Material
CAS No.	7631-86-9
Material	Mesoporous silica (Mobil Composition of Matter No. 41)
Pore system	Ordered, one-dimensional cylindrical mesopores
Preparation method	Hydrothermal method
Supplied	Calcined, ready to use directly
Grades	Type A (reagent grade); Type B (industrial grade)
Packages	20 g (Type A); 50 g and 100 g (Type B)

Characterizations — Type A and Type B

Property	Type A	Type B
Grade	Reagent grade	Industrial grade
Appearance	White powder	White powder
Particle size	100–1000 nm	200–1000 nm
Average pore diameter	3.4 nm	3.5–4.0 nm
BET surface area (m^2/g)	>850	>800
Pore volume (cm^3/g)	≥0.75	≥0.75
Na_2O	≤0.5%	≤0.5%

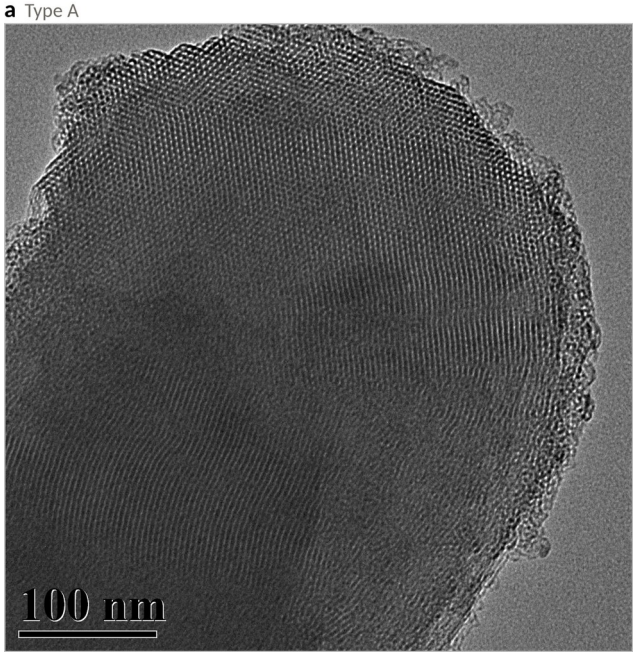
Ordering information

Option	Grade	Package	SKU
A-20g	Type A, reagent grade	20 g	MSM41A01
B-50g	Type B, industrial grade	50 g	MSM41B15
B-100g	Type B, industrial grade	100 g	MSM41B21

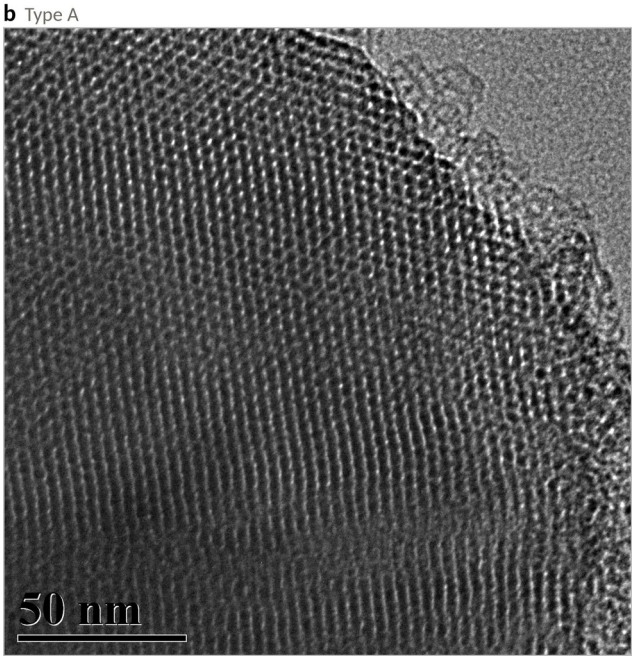
This product is calcined and ready to use directly. Please contact us for a quote if your order quantity is larger than 1 kg.

Typical data

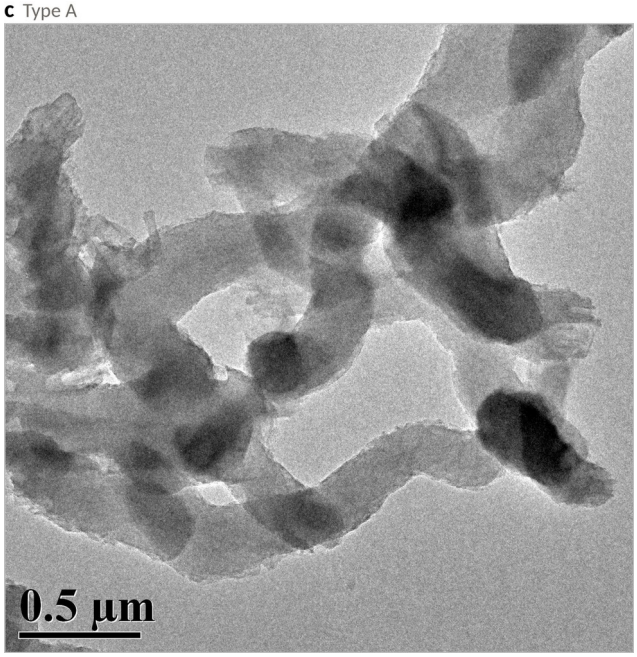
a Type A



b Type A

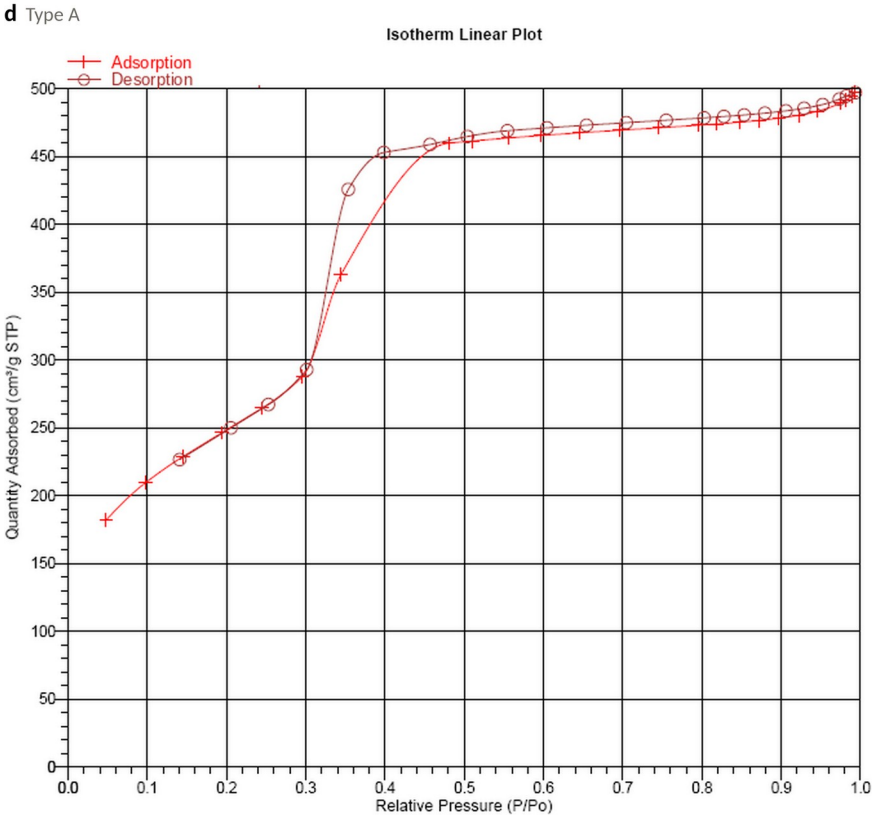


c Type A



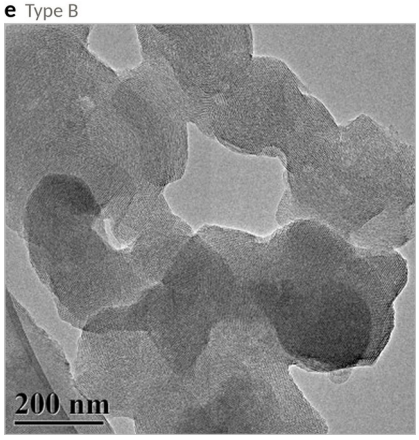
a TEM image of ACS Material MCM-41, Type A (scale bar 100 nm). **b** TEM image, Type A (scale bar 50 nm). **c** TEM image, Type A (scale bar 0.5 µm).

d Type A

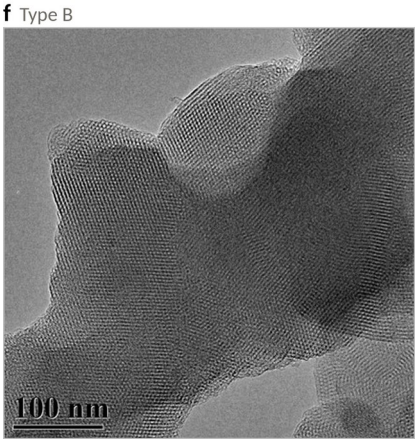


d Adsorption–desorption isotherm, Type A (linear plot).

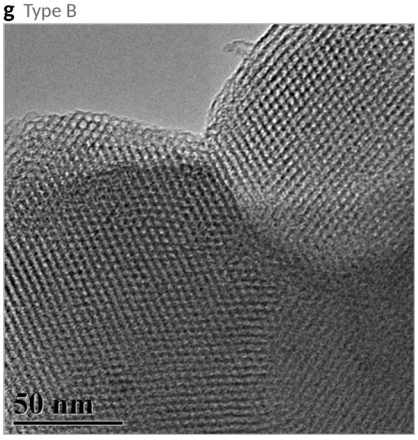
e Type B



f Type B



g Type B



e–g TEM images of ACS Material MCM-41, Type B; scale bars 200 nm (e), 100 nm (f) and 50 nm (g).

SECTION IV

Applications

MCM-41 is widely used in catalysis, including catalytic cracking, in separations, for dye removal and as an adsorbent. Its silicate framework and ordered mesopores make it well suited for use as a catalyst and as a catalytic support.

Application fields: catalyst and catalytic support; dye removal; adsorbent; separations.

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